

EDC 430: Methods & Materials in Secondary Teaching
EDC 431: Clinical Experiences for Secondary Ed
Fall 2007
School of Education
University of Rhode Island

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EDC 430: Methods & Materials in Secondary Teaching

COURSE OVERVIEW

Designed for individuals planning to teach middle or high school science, this course explores both the teacher's and the students' role in secondary science classrooms. As prospective teachers we will focus on the role of the teacher, but always with reference to the ways in which teachers interact with students to create positive environments that foster inquiry and promote meaningful learning. We will touch on numerous aspects of science classrooms including: evaluating curriculum resources, planning lessons, determining and adapting appropriate teaching methods, facilitating classroom inquiry, fostering dialog, maintaining a safe science classroom, meeting district and national standards, using technology to promote learning, and assessing students' learning.

One way this course will prepare you to become effective science teachers is by modeling the type of learning experiences suggested by what we know about how people learn. Instead of remembering information, we understand knowledge when we can reconcile it with what we already know and apply it to accomplish goals we have in our everyday lives. We *know* a concept when we trust our understandings enough to successfully apply them in new and interesting ways. People gain understanding by considering new ideas in light of old ones, watching someone with more expertise apply the ideas in authentic contexts, applying the ideas in settings where they can receive formative feedback, and discussing their new understandings with others to see if they share the same views. Much of what we do in this class will require dedication, cooperation, and collaboration around a shared goal: To thrive as student teachers and to become *exemplary* science teachers one year from now.

COURSE PREREQUISITES

Students should have already been admitted into the Teacher Education¹ or Masters of Arts / Teacher Certification Programs. You should also have completed all course requirements for student teaching. You should have already passed the PLT test as well as the PRAXIS II tests in your area(s) of certification. Students should be registered in both EDC 430 and EDC 431 this semester.

COURSE OBJECTIVES

During the semester, we will explore appropriate teaching models that reflect the nature, method and content of science in general as well as your particular scientific disciplines, the characteristics of students, and the

nature of the schools where you are working. The major course goal is to provide you with experiences that will prepare you for student teaching as well as for your initial growth as a professional science educator. As perspective teachers, you will apply what we know about how students learn to develop effective lessons, curriculum, and assessments.

As the result of the course, you will:

1. synthesize a rationale for science teaching.
2. develop portions of a course syllabus, including a statements of behavior expectations, grading, and classroom policies.
3. evaluate curriculum materials in light of the National Science Education Standards as well as the Rhode Island Curriculum Framework.
3. plan instruction that addresses specific science learning goals, supports safe and effective classroom inquiry, facilitates student sense-making, and assesses student understanding.
4. modify curriculum materials and instruction to meet the needs of various student populations.

COURSE ACTIVITIES AND EVALUATION

Your performance will be evaluated on the following:

A Rationale that Supports Your Method of Science Teaching:

A statement that justifies your teaching methods and includes ideas related to how adolescents learn science, what it means to have scientific understanding, and in what ways good teaching can foster and support scientific understanding. As you learn more about teaching and learning, we expect that ideas you learn from class and the literature will become more prominent in your thinking. This rationale can be used as part of your philosophy of teaching in a portfolio or job application packet. Each student should write a statement that justifies his or her teaching method. At the end of the course, we will ask you to revise and justify your rationale based on what you've learned in the class.

Sample Course Syllabus

At the beginning of each school year, teachers develop a set of documents that they hope will set a positive tone and communicate their expectations in each course they teach for the coming year. Syllabi might include:

- A course description
- A teacher introduction (optional)
- A grading policy
- Behavior guidelines
- Laboratory Safety Guidelines and Student Safety Contract
- A course topic outline / timeline (OPTIONAL)

Last year, my students at the University of Michigan collected sample syllabi and reflected on what they liked and did not like about the documents. If you need ideas, you can review these examples at their wikispace: <http://teacherknowledge.wikispaces.com/ED+422+Course+Syllabi+>.

Material Reviews:

- Professional Journal Article Review: To get ideas about how to extend or enhance what is going in their classrooms, teachers read professional journals. Each student will select and read two articles pertaining to science learners' understanding of a particular science concept, an activity designed to teach a particular science concept, or another issue related to teaching high or middle school from any science teacher professional journal. For each article, each student will post a summary and a personal

reaction on the course website. The science teaching journals you might select could include: *The Science Teacher*, *Science Scope*, *The American Biology Teacher*, *The Journal of Chemical Education*, *The Journal of Environmental Education*, or *The Physics Teacher*. Journals that deal with more general teaching issues include *Educational Leadership* and the *Phi Delta Kappan*.

- **Textbook Analysis:** Each student will analyze a chapter from a textbook for the phenomena included in the chapter; the text's approach to inquiry; and its use of representations to facilitate learning for a topic suggested by local or national standards within their scientific discipline. Students will share these reviews in class. By becoming familiar with a particular text (especially the one your students are using during your student teaching, you can begin thinking about what types of classroom experiences might be beneficial in order for you students to understand key concepts.

Design Lesson Plans and Sharing:

In preparation for design two lessons that could be used in an introductory course in their primary science discipline.

- The first will be a demonstration lesson in which you will help middle or high school students learn a concept.
- The second lesson will be an inquiry activity that allows students to answer a question or solve a problem from their disciplinary field of study through the collection and analysis of data.

One of these lessons should include the use of learning technology tools to extend student learning opportunities. As part of each lesson plan, students will include a rationale that uses class readings to provide support for your design decisions and safety considerations. Each of these lessons will be posted on our course website and reviewed by your peers so that they can eventually be included in your unit plans. You will also present at least one of these lessons to the class.

Unit Design:

Each class member will work with his or her cooperating teacher select a topic to address during their student teaching and develop a unit plan that addresses this topic. The unit plan should include at least 10 lessons, and include at least one opportunity for student to engage in some level of inquiry to answer a question or solve a problem through the analysis of data. These plans will also be posted and reviewed on the course website, and eventually submitted online to the SOE TrueOutcomes system.

- Unit Overview/Rationale
- Student learning goals addressing specific local or state standards.
- Concept Map or Topic Outline² – learning goals, students' prior knowledge and non-normative ideas (alternative conceptions)
- A day by day sequence of the unit that briefly describes the learning task and shows how student understanding develops over time
- At least 10 detailed lesson plans
- Safety Guidelines
- End of Unit Student Assessment

As part of the unit design, you will include a design rationale based upon course content and readings. Similar to the design of the lesson plans, the rationale should discuss why you designed the lessons in a particular manner and should reference class readings to provide support for your design decisions.

Class Participation and Readings

Active involvement in class discussion and activities is necessary for you and others to get the most out of

this course. Bring comments, questions and/or concerns to class or via email. In addition to contributing to class discussion, you will be expected to contribute and to share feedback on classmates' contributions to the course website.

Assessment Scheme: Assignments are due on the dates noted below.

Assignment	Percent of Grade	Due Date
<u>Rationale of Teaching Science</u>		
Early version	5	9/17
Late version	5	12/10
<u>Course Syllabus</u>	5	9/24
<u>Materials Review</u>		
Textbook Review	10	10/8
Professional Journals Review	10	10/1 & 10/29
<u>Lesson 1 - Demo</u>	10	10/22
<u>Revision (optional)</u>		11/5
<u>Lesson 2 - Inquiry</u>	10	11/5
<u>Revision (optional)</u>		11/19
<u>Lesson 1 or 2 Presentation</u>	10	Assigned Dates
<u>Unit Design</u>	25	
Draft 1		11/12
Learning Goals		
Overview and rationale		
Concept Map of ideas		
Planning Calendar		
Lessons 1-4		
Draft 1 conference		Assigned Dates
Draft 2 (final)		
Draft 1 Revisions		
Lesson Plans 5-10		
Unit test		11/26
<i>Class Participation</i>	10	

Revision Policy: If you decide to revise any of assessments, you are capable of receiving maximum points. Be aware that sometimes your grade may not necessarily improve.

Your final letter grade will be determined according to the following scale:

A⁺ (98-100) A (93-97) A⁻ (90-92) B⁺ (87-89) B (83-86) B⁻ (80-82)
C⁺ (77-79) C (73-76) C⁻ (70-72) D⁺ (67-69) D (63-66) D⁻ (60-62)
F (59 points or below)

Reading Assignments

Weekly reading assignments will be drawn from online sources or will be posted on the course website. Please read each assignment before the class in which it is due.

National Research Council. (2000). *Inquiry and the national science education standards: A guide for teaching and learning*. Washington, D.C.: National Academy Press.

National Research Council (2001). *Classroom assessment and the national science education standards*. Washington, DC: National Academy Press. Available to read online at:
<http://www.nap.edu/books/030906998X/html/>

American Association for the Advancement of Science. (1993). *Benchmarks for science literacy*. New York: Oxford University Press. Available to read online at:
<http://www.project2061.org/tools/benchol/bolframe.html>

National Research Council (1996). *National science education standards*. Washington, DC: National Academy Press. Available to read online at <http://www.nap.edu/readingroom/books/nses/html/>

Donovan, M. S. & Bransford, J. D. (Eds.), (2005). *How students learn: Science in the classroom*. Washington, DC: National Academy Press. Available to read online at:
http://books.nap.edu/openbook.php?record_id=10126&page=397

Council of State Science Supervisors Safety Resources Page: <http://www.csss-science.org/safety.shtml>

EDC 431: Clinical Experiences for Secondary Ed

A minimum of 3 hrs/wk should be spent this semester in your field placement. The purpose of this placement is for you to have practice in the setting in which you will be student teaching. Therefore, you should be teaching and collecting evidence for your portfolio in the class and with students you are most likely going to start with during the first weeks of student teaching. Many schools have a rotating schedule or a block schedule which makes it more difficult to work with a specific class over the course of the semester (an 8:00 am class on Monday will not meet at the same time on the next Monday). However, you should make every effort to work with the same class each week. Students in both a Middle School and a High School Placement will student teach for 7 weeks in one setting and 7 weeks in another. A plan should be developed early on with both cooperating teachers to ensure adequate time is spent in each setting. A minimum of 40 hours should be spent this semester with your cooperating teacher or teachers. There are a number of methods that can be used to meet this requirement. However, continuity in each site is important.

Students must receive a Satisfactory "S" in EDC 431 to move on to student teaching.

Next semester the estimated dates for student teaching are:

*Secondary 7-12 certification without Middle level endorsement:

January 22, 2008 - May 9, 2008 (14 wks)

*Secondary 7-12 certification with Middle level endorsement:

January 22, 2008 - March 14, 2008 in first placement (7 wks)

March 17, 2008 - May 9, 2008 in second placement (7 wks)

If you have a documented disability that requires accommodations, please make an appointment with me prior to the third class meeting. We will discuss how to meet your individual needs to ensure your full participation and fair assessment procedures. For further information or assistance please contact the staff at Disabilities Services for Students (Office of Student Life), 330 Memorial Union, 874-2098.